

Serial No. 09/382,459

**IN THE CLAIMS:**

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 3-4, 7, 12, 16-18, 20, 22, 24, 26, 33 and 38 in accordance with the following:

1. (PREVIOUSLY PRESENTED) A digital circuitry, operative repetitively to perform a series of processing cycles, comprising:

an input signal processing circuit performing, in each cycle, a predetermined processing operation on one or more input signal(s) received by the digital circuitry to derive therefrom one or more first signal(s), said predetermined processing operation being commenced in response to a first clock signal;

a first clocked element receiving said one or more first signal(s) and a second clock signal, and producing one or more second signal(s), said first clocked element being switchable by said second clock signal between a first responsive state, in which the first clocked element changes said one or more second signal(s) in response to a change in said one or more first signal(s), and a first non-responsive state in which no change in said one or more second signal(s) occurs;

a second clocked element receiving said one or more second signal(s) and a third clock signal, and producing one or more output signal(s) of said digital circuitry, said second clocked element being switchable by said third clock signal between a second responsive state, in which the second clocked element changes said one or more output signal(s) in response to a change in said one or more second signal(s), and a second non-responsive state in which no change in said one or more output signal(s) occurs; and

a clock generating circuitry generating the second and third clock signals from the first clock signal, the second clock signal being delayed relative to the first clock signal by a preselected delay time and said third clock signal being delayed relative to the first clock signal by less than said preselected delay time such that in each cycle the first clocked element enters said first non-responsive state before the end of said predetermined processing operation, and said second clocked element enters said second responsive state when the first clocked element is in said first non-responsive state.

*please Enter  
Edo Chang  
1/18/2006*

Serial No. 09/382,459

2. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, wherein said third clock signal has no substantial delay relative to said first clock signal.

3. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 1, wherein said preselected delay time is chosen such that said first clocked element enters said first non-responsive state at least a predetermined hold time before ~~an~~the end of said predetermined processing operation, which the predetermined hold time is the minimum period for which the one or more first signal(s) must remain stable after the first clocked element enters said first non-responsive state.

4. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 1, wherein a predetermined enabling change in said ~~generated~~ third clock signal enabling the second clocked element to change from said second non-responsive state to said second responsive state, and said predetermined enabling change occurs substantially simultaneously with a first change in said first clock signal.

5. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 4, wherein said first change in the first clock signal is a predetermined enabling change enabling in said first clock signal said predetermined processing operation to commence.

6. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 4, wherein a predetermined disabling change in the third clock signal, enabling the second clocked element to change from said second responsive state to said second non-responsive state, is delayed relative to a second change in the first clock signal.

7. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 6, wherein the clock generating circuitry comprises:

a delay element delaying the first clock signal to produce ~~the~~a delayed version thereof;  
and

a logic element logically combining the first clock signal with ~~a~~the delayed version thereof such that said predetermined enabling change in the third clock signal occurs substantially simultaneously with said predetermined enabling change in said first clock signal, and said predetermined disabling change in the third clock signal occurs substantially simultaneously with

Serial No. 09/382,459

a change in said delayed version of the first clock signal.

8. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 7, wherein said clock generating circuitry further comprises:

a delay balancing element connected between said delay element and said first clocked element receiving said delayed version of the first clock signal and deriving therefrom said second clock signal;

the delay balancing element having a first propagation delay between said change in the delayed version of the first clock signal and a predetermined enabling change in said second clock signal that causes the first clocked element to change from said first non-responsive state to said first responsive state;

said logic element having a second propagation delay between said change in said delayed version of the first clock signal and said disabling change in the third clock signal; and said first propagation delay being substantially equal to said second propagation delay.

9. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, wherein said input signal processing circuit comprises:

a third clocked element receiving said one or more input signal(s) and said first clock signal, and producing one or more basic clock signal(s), said third clocked element being switchable by said first clock signal between a third responsive state, in which said third clocked element changes said one or more basic clock signal(s) in response to a change in said one or more input signal(s), and a third non-responsive state in which no change in said one or more basic clock signal(s) occurs; and

a signal processing circuitry processing said one or more first signal(s) from said one or more changed basic clock signal(s) and said one or more basic clock signal(s).

10. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, wherein said first clocked element comprises a D-type latch element.

11. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, wherein said second clocked element comprises a transparent half-latch element.

12. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 1, at least one of said one or more first signal(s) and said one or more second signal(s), or said one or

Serial No. 09/382,459

more first signal(s) and said one or more output signal(s), or said one or more second signal(s) and said one or more output signal(s) is a complementary signal pair.

13. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, wherein the at least one of the said one or more first signal(s), or said one or more second signal(s), or said one or more output signal(s) is a thermometer-coded signal.

14. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 1, further including power supply circuitry supplying power to said second clocked element independently from that supplied to at least another part of said digital circuitry.

15. (PREVIOUSLY PRESENTED) A digital circuitry, operative repetitively to perform a series of processing cycles, comprising:

a plurality of individual circuit units, each circuit unit comprising:

an input signal processing circuit performing, in each cycle, a predetermined processing operation on one or more input signal(s) received by the digital circuitry to derive therefrom one or more first signal(s), said predetermined processing operation being commenced in response to a first clock signal,

a first clocked element receiving said one or more first signal(s) and a second clock signal, and producing one or more second signal(s), said first clocked element being switchable by said second clock signal between a first responsive state, in which the first clocked element changes said one or more second signal(s) in response to a change in said one or more first signal(s), and a first non-responsive state in which no change in said one or more second signal(s) occurs,

a second clocked element receiving said one or more second signal(s) and a third clock signal, and producing one or more output signal(s) of said digital circuitry, said second clocked element being switchable by said third clock signal between a second responsive state, in which the second clocked element changes said one or more output signal(s) in response to a change in said one or more second signal(s), and a second non-responsive state in which no change in said one or more output signal(s) occur, and

a clock generating circuitry generating the second and third clock signals from the first clock signal, the second clock signal being delayed relative to the first clock signal by a preselected delay time and said third clock signal being delayed relative to the first clock signal by less than said preselected delay time such that in each cycle the first clocked element enters

Serial No. 09/382,459

said first non-responsive state before the end of said predetermined processing operation, and said second clocked element enters said second responsive state when the first clocked element is in said first non-responsive state.

16. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 15, wherein the clock generating circuitry comprises:

a global clock generator provided in common for all said individual circuit units and operable to produce a basic clock signal; and

a plurality of local clock drivers, each of said local clock drivers corresponding to one or more of said circuit unit(s), and each said local clock driver being connected to the global clock generator for receiving therefrom said basic clock signal and being operable to derive therefrom said third clock signal for application to said second clocked circuit in each of its said one or more corresponding individual circuit unit(s).

17. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 16, wherein each of said individual circuit unit-units has its own individually-corresponding one of said local clock drivers.

<sup>19</sup> 18. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 16, wherein said global clock generator is operable to produce said basic clock signal and a complementary basic clock signal, wherein both said basic clock signal and said complementary basic clock signal are applied in common to all of said ~~local clock drivers of said~~ plurality of local clock drivers.

<sup>20</sup> 19. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim 15, having at least two power supplies for the plurality of individual circuit units, each said power supplies corresponding to one or more of said circuit unit(s) and supplying power to a predetermined part of its said one or more corresponding circuit unit(s), said digital circuitry further comprising a power supply decoupling circuit decoupling said at least two power supplies from one another.

<sup>21</sup> <sup>20</sup> 20. (CURRENTLY AMENDED) The digital circuitry as claimed in claim <sup>20</sup> 19, wherein each of said circuit unit-units has its own individually-corresponding one of said at least two power supplies, and said power supply decoupling circuit decouples the power supply of said predetermined part of ~~each~~ said one or more corresponding circuit unit(s) from that of each other

Serial No. 09/382,459

one of the one or more corresponding circuit unit(s).

22 ~~21~~. (PREVIOUSLY PRESENTED) The digital circuitry as claimed in claim <sup>20</sup>~~18~~, wherein said predetermined part of said one or more corresponding circuit unit(s), includes said second clocked element.

18 ~~22~~. (CURRENTLY AMENDED) The digital circuitry as claimed in claim 17, having at least two power supplies for the plurality of individual circuit units, each power supply corresponding to one or more of said circuit unit(s) and supplying power to a predetermined part of its said one or more corresponding circuit unit(s), said digital circuitry further comprising:  
a power supply decoupling circuit decouplings said at least two power supplies from one another;

wherein said predetermined part of said circuit unit(s) includes said second clocked element and said local clock driver of each of said individual circuit units.

23. (PREVIOUSLY PRESENTED) A mixed-signal circuitry, including:  
a digital circuitry, operative repetitively to perform a series of processing cycles, comprising:

an input signal processing circuit performing, in each cycle, a predetermined processing operation on one or more input signal(s) received by the digital circuitry to derive therefrom one or more first signal(s), said predetermined processing operation being commenced in response to a first clock signal,

a first clocked element receiving said one or more first signal(s) and a second clock signal, and producing one or more second signal(s), said first clocked element being switchable by said second clock signal between a first responsive state, in which the first clocked element changes said one or more second signal(s) in response to a change in said one or more first signal(s), and a first non-responsive state in which no change in said one or more second signal(s) occurs,

a second clocked element receiving said one or more second signal(s) and a third clock signal, and producing one or more output signal(s) of said digital circuitry, said second clocked element being switchable by said third clock signal between a second responsive state, in which the second clocked element changes said one or more output signal(s) in response to a change in said one or more second signal(s) to change the one or more output signal(s) of said digital circuitry, and a second non-responsive state in which no change in said one or more output

Serial No. 09/382,459

signal(s) occurs, and

a clock generating circuitry generating the second and third clock signals from the first clock signal, the second clock signal being delayed relative to the first clock signal by a preselected delay time and said third clock signal being delayed relative to the first clock signal by less than said preselected delay time such that in each cycle the first clocked element enters said first non-responsive state before the end of said predetermined processing operation, and said second clocked element enters said second responsive state when the first clocked element is in said first non-responsive state; and

an analog circuitry connected to said digital circuitry for receiving therefrom said one or more output signal(s) and operable to produce one or more analog signal(s) in dependence upon the received one or more output signal(s).

24. (CURRENTLY AMENDED) The mixed-signal circuitry as claimed in claim 23, including a digital-to-analog converter as a part of the analog circuitry to produce the one or more analog signal(s).

25. (PREVIOUSLY PRESENTED) The mixed-signal circuitry as claimed in claim 23, wherein the analog circuitry further comprises:

a plurality of current sources or current sinks sourcing or sinking respective currents, and a plurality of switch circuits, connected to the plurality of current sources or current sinks switching said currents selectively in dependence upon the received one or more output signal(s) so as to produce said one or more analog signal(s).

26. (CURRENTLY AMENDED) The mixed-signal circuitry as claimed in claim 23, wherein said digital circuitry further comprises:

a power supply circuitry supplying power to a first part of said digital circuitry independently from that supplied to a second part of said digital circuitry,

wherein said first part of said digital circuitry is the second clocked element, said second part of said digital circuitry is at least one of said input signal processing circuit, said first clocked element, and said clock generating circuitry, and wherein said power supply circuitry also supplies power to said analog circuitry independently of said power supplied to the first part of said digital circuitry and to said second part of the digital circuitry.

Serial No. 09/382,459

## 27.-32. (CANCELLED)

<sup>27</sup> 33'. (CURRENTLY AMENDED) A digital-analog converter circuit, comprising:  
a digital circuit to perform a series of processing cycles, comprising:  
an input signal processing circuit clocked by a first clock signal, inputting one or more first signal(s), performing a predetermined processing operation of the one or more first signal(s), and outputting a first output signal,  
a first latch circuit clocked by a second clock signal, inputting the first output signal, and outputting a second output signal,  
a second latch circuit clocked by a third clock signal, and inputting the second output signal from the first latch circuit, and  
a clock generating circuit generating the second and the third clock signals from the first clock signal,  
the second clock signal being delayed relative to the first clock signal by a predetermined delay time, and a rising edge of the third clock signal edge occurring at substantially the same time as a rising edge of the first clock signal and a falling edge of the third clock signal occurring at substantially the same time as a rising edge of the second clock signal;  
and  
an analog circuit connected to said digital circuit receiving therefrom said one or more output signal(s) and operable to produce one or more analog signal(s) in dependence upon said one or more output signal(s).

<sup>28</sup> 34. (PREVIOUSLY PRESENTED) The digital-analog converter circuit as claimed in claim 33', wherein the clock generating circuit comprises:

<sup>27</sup> a delay element delaying the first clock signal to produce a delayed version thereof, and  
a logic element logically combining the first clock signal with the delayed version thereof such that an enabling change in the third clock signal occurs substantially simultaneously with an enabling change in the first clock signal, and a disabling change in the third clock signal occurs substantially simultaneously with a change in the delayed version of the first clock signal.

<sup>29</sup> 35. (PREVIOUSLY PRESENTED) The digital-analog converter circuit as claimed in claim 34', wherein said clock generating circuit further comprises:

<sup>28</sup> a delay balancing element connected between said delay element and said first clocked element receiving said delayed version of the first clock signal and deriving therefrom said



Serial No. 09/382,459

second clock signal,

the delay balancing element having a first propagation delay between said change in the delayed version of the first clock signal and a predetermined enabling change in said second clock signal causing the first clocked element to change from a first non-responsive state to a first responsive state,

said logic element having a second propagation delay between said change in the delayed version of the first clock signal and said disabling change in the third clock signal, and said first propagation delay being substantially equal to said second propagation delay.

30 36. (CURRENTLY AMENDED) A digital-analog converter circuit, comprising:

a digital circuit to perform a series of processing cycles, comprising:

an input signal processing circuit clocked by a first clock signal, inputting one or more first signal(s), and performing a predetermined processing operation on the one or more first signal(s), and outputting a first output signal,

a first latch circuit clocked by a second clock signal and inputting the first output signal,

a second latch circuit clocked by a third clock signal and inputting an output signal from the first latch circuit, and

a clock generating circuit generating the second and third clock signals from the first clock signal, the second clock signal being delayed relative to the first clock signal by a predetermined delay time, a rising edge of the third clock signal without a substantial delay time relative to a rising edge of the first clock signal or with a shorter delay time than the delay time of the second clock signal and making the second latch circuit enter a responsive state during a non-responsive state of the first latch circuit; and

an analog circuit connected to said digital circuit receiving therefrom one or more output signal(s) to produce one or more analog signal(s) in dependence upon said one or more output signal(s) received from the digital circuit.

31 37. (PREVIOUSLY PRESENTED) The digital-analog converter circuit as claimed in claim 36, wherein the clock generating circuit comprises:

30 a delay element delaying the first clock signal to produce a delayed version thereof, and a logic element logically combining the first clock signal with the delayed version thereof such that an enabling change in the third clock signal occurs substantially simultaneously with

Serial No. 09/382,459

an enabling change in the first clock signal, and a disabling change in the third clock signal is substantially simultaneous with a change in the delayed version of the first clock signal.

32 38. (CURRENTLY AMENDED) The digital-analog converter circuit as claimed in claim 37, wherein said clock generating circuit further comprises:

31 a delay balancing element connected between said delay element and said first clocked element ~~latch element~~ for receiving said delayed version of the first clock signal and for deriving therefrom said second clock signal,

the delay balancing element having a first propagation delay between said change in the delayed version of the first clock signal and a predetermined enabling change in said second clock signal that causes the first clocked element to change from ~~a~~ the first non-responsive state to a ~~the~~ first responsive state,

said logic element having a second propagation delay between said change in the delayed version of the first clock signal and said disabling change in the third clock signal, and said first propagation delay being substantially equal to said second propagation delay.

39. (CANCELLED)

33 40. (PREVIOUSLY PRESENTED) A digital-analog converter circuit, comprising:  
a digital circuit performing a series of processing cycles, comprising:  
a digital input circuit receiving a plurality of digital signals in response to a first clock signal,

a delay element receiving the first clock signal and outputting a delayed clock signal,  
a clock generating circuit receiving the first clock signal and generating a second clock signal, produced from the delayed clock signal, and a third clock signal, produced from the first clock signal and the delayed clock signal,

a first latch circuit, coupled to the digital input circuit, receiving an output signal from the digital input circuit in response to the second clock signal, and

a second latch circuit, coupled to the first latch circuit, receiving an output signal from the first latch circuit in response to the third clock signal; and

an analog circuit connected to said digital circuit, receiving therefrom one or more output signal(s), and producing one or more analog signal(s) in dependence upon the received one or more output signal(s) from the digital circuit.

Serial No. 09/382,459

34 ~~AT~~. (PREVIOUSLY PRESENTED) A digital-analog converter circuit comprising:  
a digital circuit to perform a series of processing cycles, comprising:

an input signal processing circuit clocked by a first clock signal, inputting one or more first signal(s), and performing a predetermined processing operation on the first signal(s), and outputting a first output signal;

a clock generating circuit generating second and third clock signals from the first clock signal, the second clock signal being delayed relative to the first clock signal by a first preselected delay time and the third clock signal being delayed relative to the first clock signal by a second preselected delay time;

a first latch circuit being switchably clocked by the second clock signal;

a second latch circuit clocked by the third clock signal, wherein the first latch circuit and the second latch circuit operate between a responsive state and a non-responsive state by turns; and

an analog circuit connected to said digital circuit receiving therefrom one or more output signal(s) to produce one or more analog signal(s) in dependence upon one or more output signal(s) from the digital circuit.